



## QUICK REVISION MODULE (UPSC PRELIMS 2022) ECONOMICS AGRICULTURE

### INTRODUCTION

Agriculture is the primary source of livelihood for about **58% of India's population.**



**Share of agriculture and allied sectors in GDP of India at current prices stood at 19.9 % in 2020-2021.**

India ranks first in the world with highest net cropped area followed by US and China.



## AGRICULTURE & ALLIED SECTORS

Growth rate of GVA at basic prices in percent

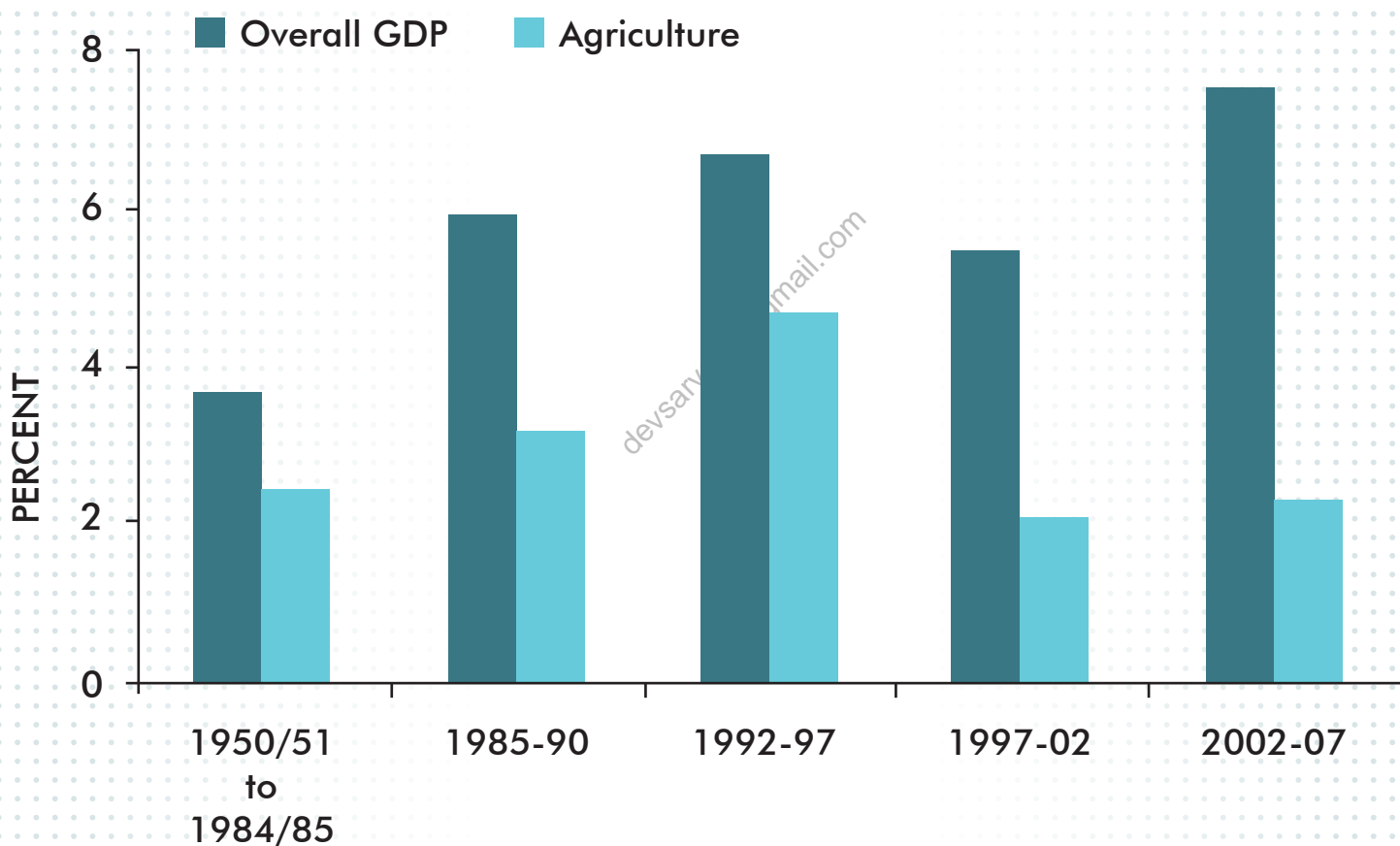
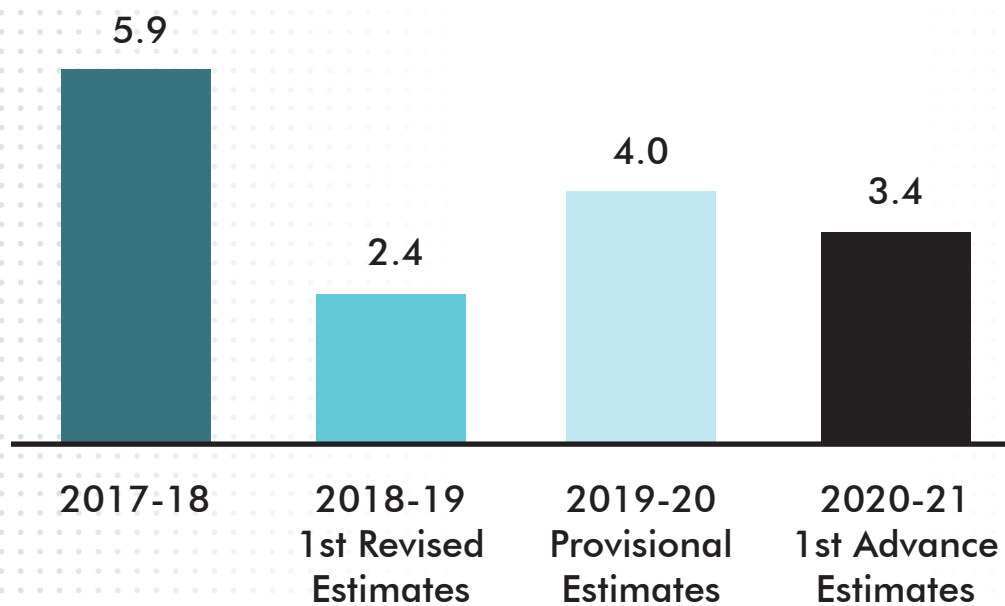
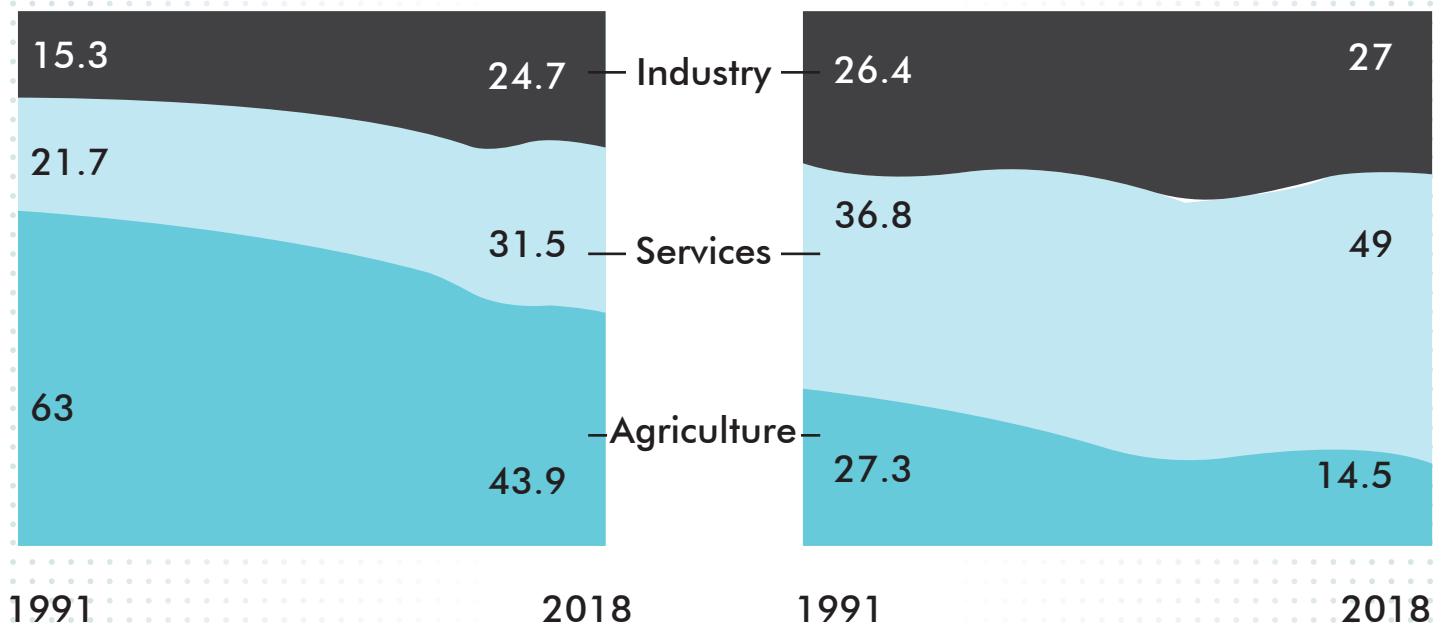


Fig: Average Annual Growth Rate of GDP and Agriculture in India (at Constant Prices)

### % SHARE IN EMPLOYMENT

### % SHARE IN GDP



## CROPPING PATTERN

It indicates the temporal and/or spatial arrangement of crops in a particular area. There are different types of cropping patterns depending on the availability of various factors/resources.

## CROPPING SYSTEM

It comprises **all cropping patterns grown on the farm** and their interaction with farm resources, other household / farm enterprises, available technology which determine their makeup and the physical, biological, technological and sociological factors or environments.



## MAJOR CATEGORIES OF CROPPING PATTERN FOLLOWED IN INDIA

### Kharif (monsoon crops)

#### Rice based

**Relay Cropping** - seed of succeeding crops like lentil, gram, pea, lathyrus, berseem, linseed etc. is sown through broadcasting in maturing rice crop. It is done in both upland and lowland rice culture.

**Mixed varietal cropping of rice** - Mixing the seeds of early rice (ahu) with late maturing deep water rice (bao). It is mainly practiced in West Bengal.

#### Non-Rice-Based

Maize-based  
Bajra-based  
Cotton-based

### Rabi (post-monsoon crops)

#### Wheat and Gram Based

These two crops are grown under identical climate and can often be substituted for each other.

#### Rabi-Jowar-Based

Along with Jowar, bajra, pulses, oilseeds and tobacco are grown as alternative crops.

## CROPPING SYSTEM

Planting arrangements in time and space on a piece of land, and associated crop management techniques.

### 1. CROP SUCCESSION

More than one year

- Monoculture
- Rotation
- Fallow Cropping

### 2. CROPPING PATTERN

One Year



## 2A. SINGLE CROPPING

One crop, one piece of land

- Tree crop planting pattern
- Annual crop spatial pattern

## 2B. MULTI CROPPING

More than one crop, one piece of land

### SEQUENTIAL CROPPING

Growing two or more crops convectively

- Double crop
- Triple crop
- Relay crop
- Cover crop

### INTERCROPPING

Growing two or more crops simultaneously

- Mixed crop
- Row inter-crop
- Strip crop
- Multi storey-crop

## 3. CROP MANAGEMENT TECHNIQUES

Actions on piece of land

- Irrigation
- Soil tillage
- Harvest
- Varieties
- Weed control
- Fertilizer application

## MIXED CROPPING VS INTERCROPPING

### MIXED CROPPING

- Aimed to **minimize the risk** of crop failure.
- **Seeds of different crops are mixed** together before sowing.
- All the crops are **sown at the same time**.
- Crop **sowing is random**.
- Pest control is relatively difficult.
- Equal emphasis is given to all the crops.
- Same fertilizer and pesticide is applied to all crops.

### INTERCROPPING

- Aimed to **increase productivity** from unit area.
- Seeds are **not mixed**.
- Crops can be sown at the **same or different time**.
- Different crops are **grouped** in different rows or columns.
- Pest control is relatively easier.
- More emphasis is given to main crops.
- Specific fertilizer and pesticide is applied to each crops.

## CROPPING INTENSITY

It refers to number of crops cultivated in a piece of land per annum is cropping intensity.

$$\text{Cropping Intensity} = \text{Gross Cropped Area} / \text{Net Sown Area} \times 100$$

Gross Cropped Area (GCA) is the total area sown once as well as more than once in a particular year. On the other hand, Net Sown Area is the area sown with crops but is counted only once.

## RECENT TREND IN AGRICULTURE SECTOR

**Dominance of food crops** over non-food crops.

**Dominance of cereals** among food crops.

**Decline in coarse cereals.**

**Declining importance of Kharif crops** (Reason: The Kharif crops are more monsoon dependent than Rabi crops).

**Declining share of Agriculture in India's GDP** (50% of GDP in the 1950s to less than 20 % in the current times).

Increasing Trend in **Horticultural and Floricultural Output.**

Expansion of Trade in agricultural products.

Growing trend of institutionalization of agricultural credit.

Growing Volume of Subsidies (in respect of fertilizer, irrigation and electricity charges etc.).

## ORGANIC FARMING

Organic production is a holistic system designed to optimize the productivity and fitness of diverse communities within the agro-ecosystem, including soil organisms, plants, livestock and people.



### PRINCIPAL

- Crop rotation.
- No agrochemicals.
- No GMOs.
- No synthetic fertilizers.
- Organic fertilizers.
- Reducing the use of non-renewable resources.
- Use of local resources.




### EFFECT

- Reduced soil loss.
- Lower energy use.
- Lower water consumption.
- Improved soil water holding capacity.
- Increased soil organic matter.
- Larger floral, faunal and microbiological biodiversity.

Fig: The main principles and effects of organic farming.

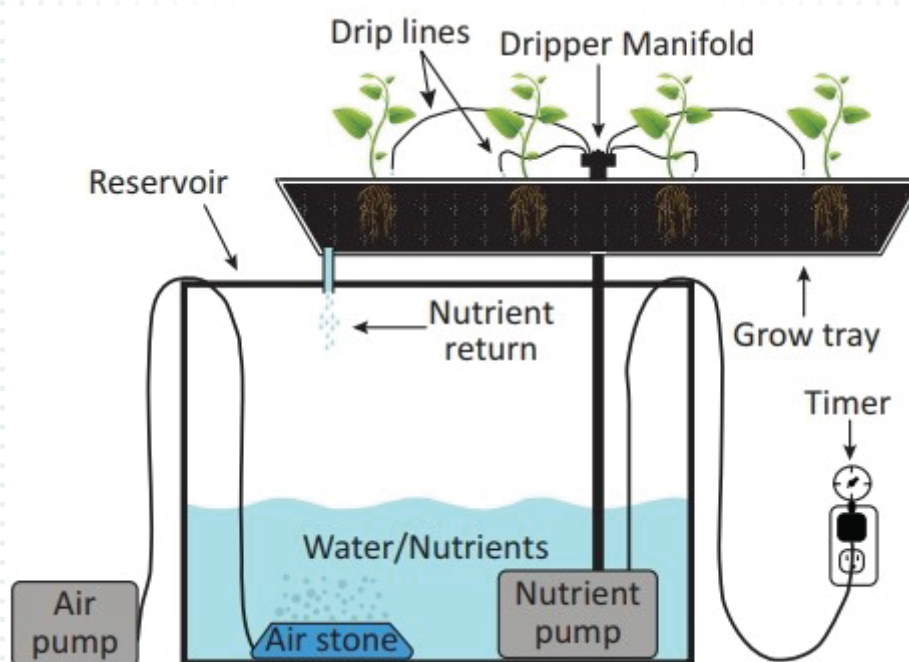
India is home to **30 per cent of the total organic producers** in the world, but accounts for just 2.59 per cent of the total organic cultivation area of 57.8 million hectares, according to the **World of Organic Agriculture 2018 report**.

### ISSUES

- Multiple certification systems: These are not only **cumbersome and time-consuming**, but also expensive. 
- Expensive organic produce discourages customers, affects sales. 
- Productivity dips in the beginning, making transition process more difficult. 

## HYDROPONICS

Hydroponics is the method of growing plants **without soil**, using mineral nutrient solutions in water. Plants are suspended with their roots submerged in water that contain plant nutrients. The roots absorb water and nutrients, but do not perform the anchoring function. Therefore, the plants must be mechanically supported from above.



- The core elements required are: Fresh water, Oxygen, Root Support, Nutrients, Light.

### IMPORTANCE OF HYDROPONICS

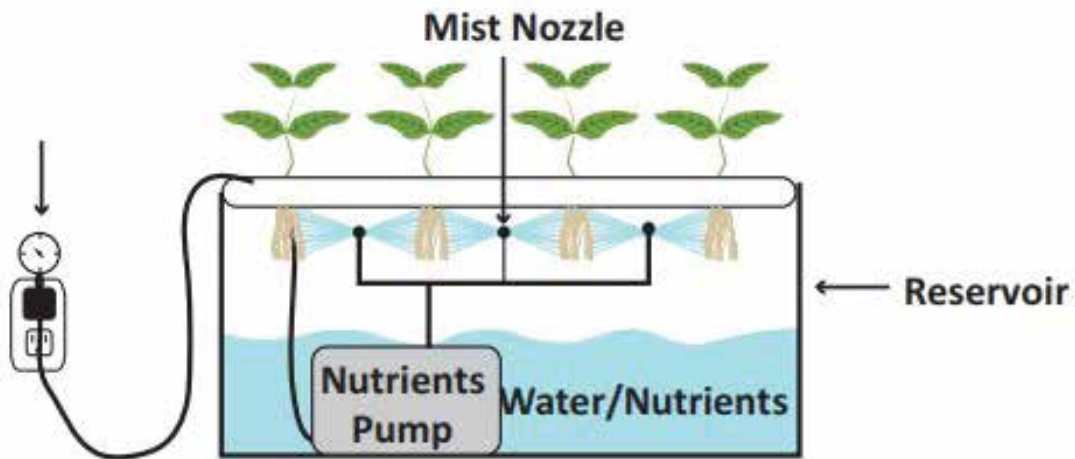
- Conservation of water and nutrients
- Controlled plant growth; In deserts and
- In deserts and arctic regions, hydroponics can be an effective alternative method.

### ADVANTAGES

- Grow Anywhere
- Higher Yields
- Need fewer Resources
- Easy troubleshooting etc.

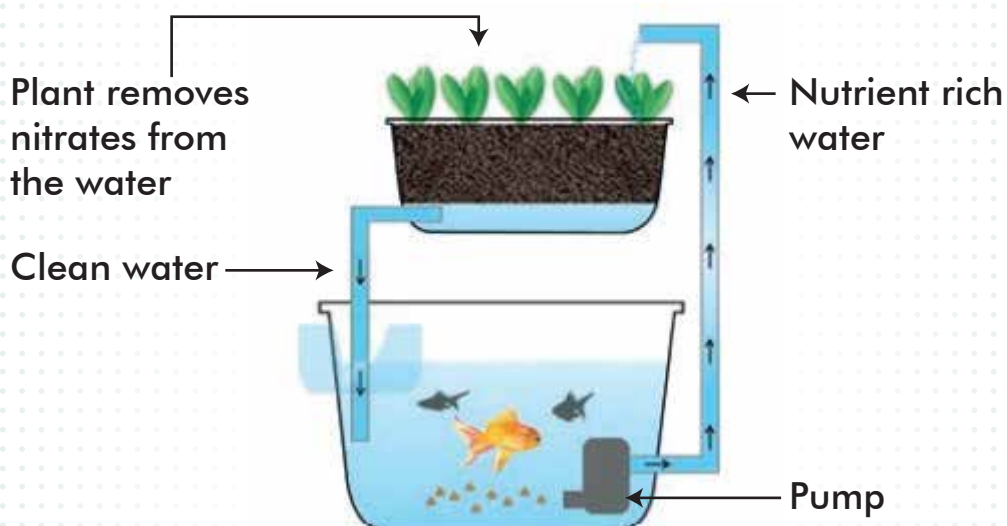
## AEROPONICS

The aeroponic system is the **high-tech type of hydroponic gardening**. The **growth medium in this type is primarily air**. The roots hang in the air and are misted with nutrient solution. The misting is usually done for every few minutes, as roots will dry out rapidly if the misting cycles are interrupted.



## AQUAPONICS

Aquaponics is a system of a **combination of conventional aquaculture with hydroponics in a symbiotic environment**, in which plants are fed with the aquatic animals' excreta or wastes. These wastes are broken down by nitrifying bacteria initially into nitrites and later into nitrates that are utilized by the plants as their nutrients. Thus, the wastes are utilized and water is recirculated back to the aquaculture system.





## HORTICULTURE

Horticulture is a branch of agriculture that **deals with cultivation of fruits, vegetables, and ornamental plants.**

There are four main classes of horticulture:

- (i) Pomology (fruit farming),
- (ii) Olericulture (vegetable farming),
- (iii) Floriculture (flowers farming),
- (iv) Landscape gardening.

## ZERO BUDGET NATURAL FARMING

It (ZBNF) is a natural farming technique, developed by **Subhash Palekar**, in which farming is done without use of chemicals which reduces the cost of production down to zero due to utilization of all the natural resources available in and around the crops. The Andhra Pradesh government is supporting the ZBFN movement of the farmers and has planned to become the First State to become "100% Natural Farming State" by 2024.

### THE FOUR ELEMENTS OF ZERO BUDGET NATURAL FARMING

#### BEEJAMRUTHAM

Seed treatment with cow dung and urine based formulations.

#### JEEVAMRUTHAM

Ensuring soil fertility through cow dung, and cow urine based concoctions.

#### MULCHING

Trees, cover crops, and crop residues.

#### WAAPHASA

Water vapour condensation for better soil moisture.



## CONSERVATION AGRICULTURE

CA is a farming system that can prevent losses of arable land while regenerating degraded lands. It **conserves natural resources, biodiversity and labor**. Here, **Zero/ Minimal tillage** is combined with **intercropping and crop rotation**.



Minimum soil disturbance



Permanent soil cover: crop residue or live mulch



Crop rotation or intercropping

Fig: Three principles of Conservation agriculture.

### IS CONSERVATION AGRICULTURE ORGANIC?

Conservation agriculture and organic farming both maintain a balance between agriculture and resources, use crop rotation, and protect the soil's organic matter. However, the **main difference between these two types of farming is that organic farmers use a plow or soil tillage, conservation agriculturists use natural principles and do not till the soil.**

## KEY DIFFERENCES BETWEEN NATURAL FARMING AND ORGANIC FARMING

### NATURAL FARMING

- No external fertilizers are added to soil.
- No plowing, no tilting of soil and no fertilizers, and no weeding is done.
- It is an extremely low-cost farming method, completely molding with local biodiversity.

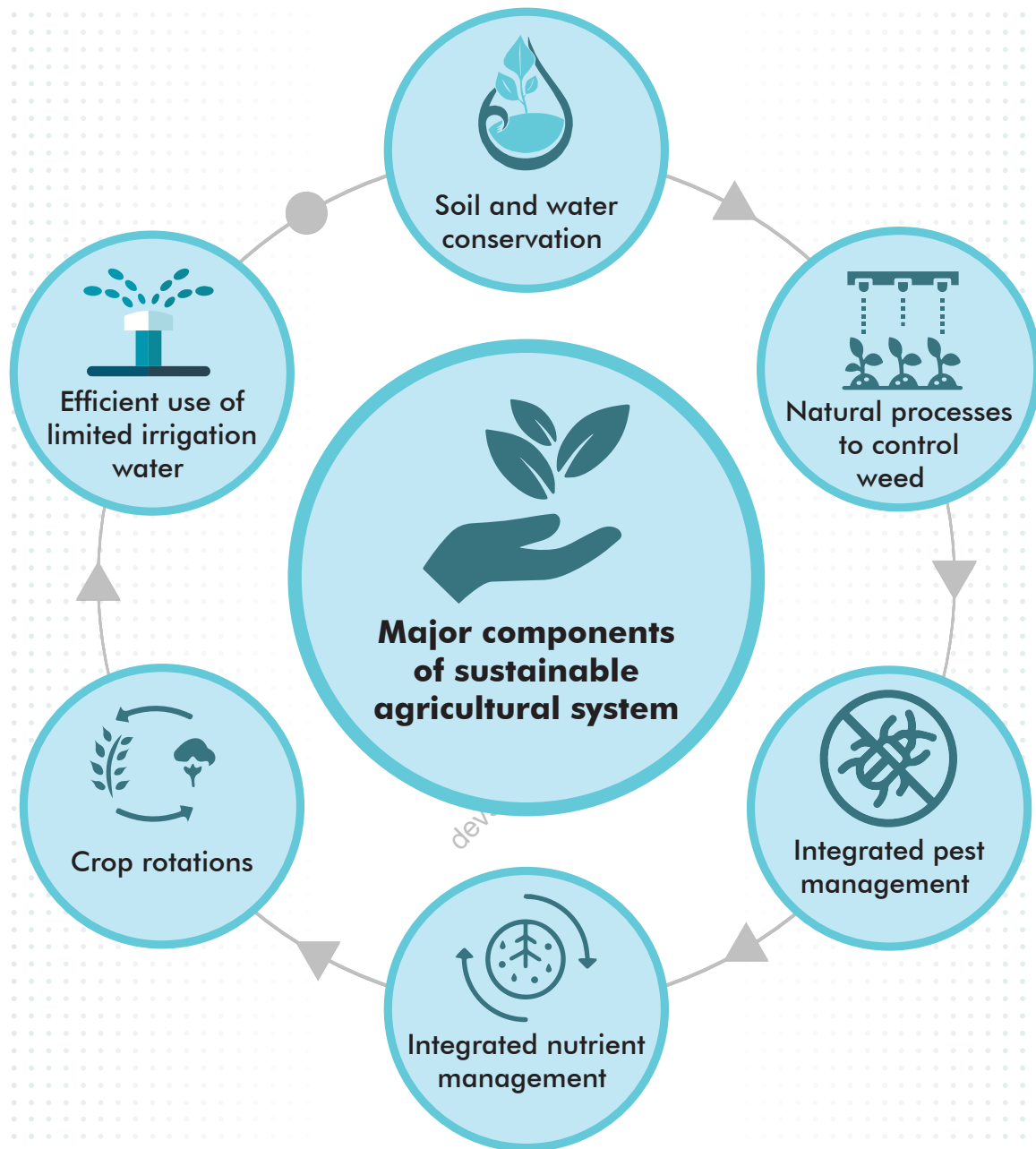
### ORGANIC FARMING

- Organic fertilizers and manures are added to farmlands.
- It requires basic agro practices like plowing, tilting, weeding, etc. to be performed.
- It is still expensive due to the requirement of bulk manures, and it has an ecological impact on surrounding environments.



## SUSTAINABLE AGRICULTURE

A farming system that is "**capable of maintaining their productivity and usefulness to society indefinitely** and must be resource-conserving, socially supportive, commercially competitive, and environmentally sound."



## AGRICULTURAL MARKETING

It refers to **all the activities, agencies and policies involved** in the procurement of farm inputs by the farmers and the movement of agricultural produce from the farms to the consumers.

The **Indian ICAR** includes **three important functions** involved in agricultural marketing, **namely**

- **Assembling** (concentration)
- **Preparation for consumption** (processing) and
- **Distribution.**

### TYPES OF AGRICULTURAL MARKETING IN INDIA



#### Traditional Marketing Methods

Here, the produce is directly sold by the farmers involving number of intermediaries. Close to 50% of the agricultural produce in India is sold via these channels.



#### Cooperative Marketing Method

Agriproducts are directly purchased from farmers through marketing network of NAFED, thus eliminating middlemen.



#### Emerging Models of Agri Marketing

eg:

1. National Agriculture Market (eNAM)
2. Farmer Producer Organizations
3. Contract Farming
4. Commodity and Future Market

### Agricultural Produce Market Committee (APMC)

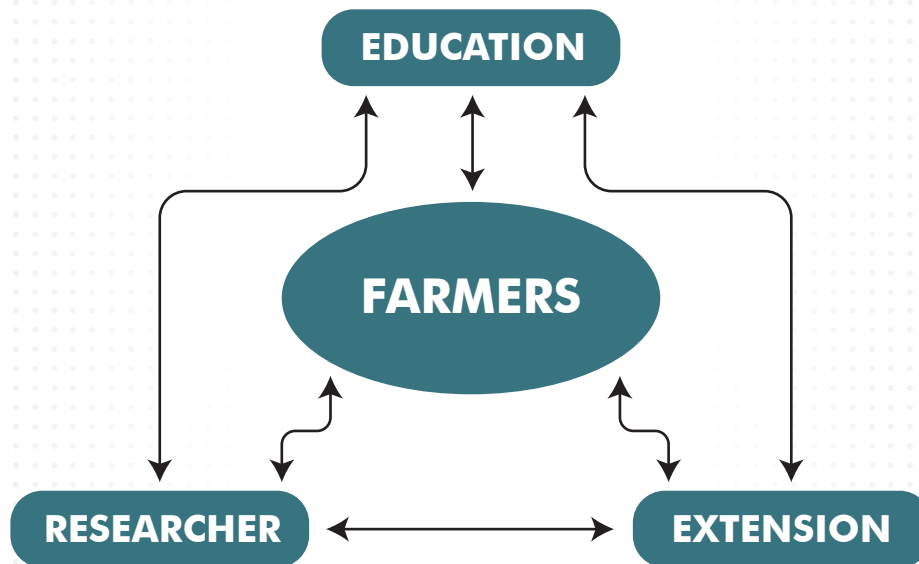
**Agricultural Produce Market Committee (APMC)** is a **statutory market committee** constituted by a State Government in respect of trade in certain notified agricultural or horticultural or livestock products, under the APMC Act.

Agriculture is a '**state**' subject. Therefore, numerous mandis under various APMC laws of states exist where **first sale of notified commodity** happens.

The Ministry of Agriculture and Farmers' Welfare made attempts to overhaul the regulatory system by proposing the **Model APMC Act, 2003** and **Model State/UT Agricultural Produce and Livestock Marketing (Promotion & Facilitation) Act, 2017**.

## AGRICULTURAL RESEARCH AND EXTENSION

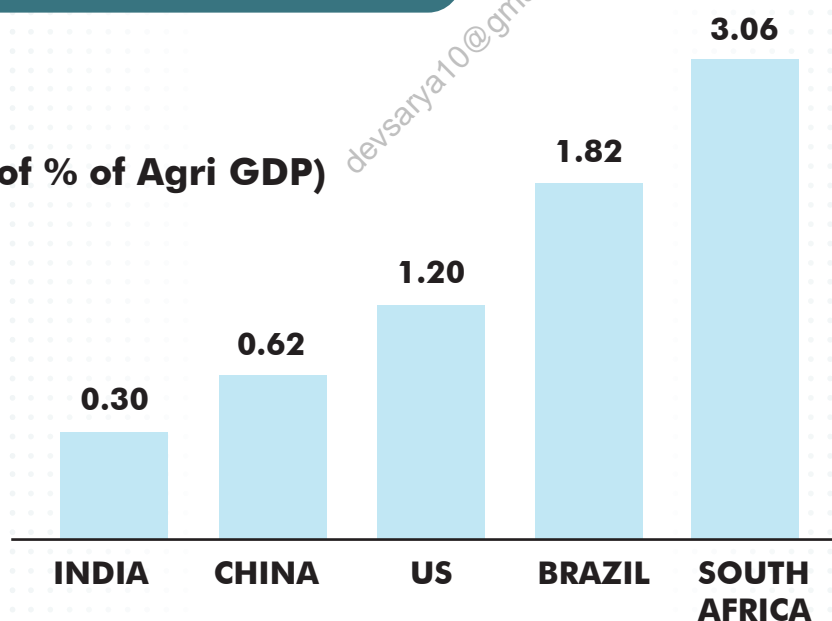
The agricultural extension is **helpful in transferring relevant knowledge and information** to farmers as well as in translating policy directions into action.



**Fig:** Agricultural extension as part of Agricultural Knowledge System/Agricultural Knowledge Information System.

### AGRICULTURE RESEARCH SPENDING

(As of % of Agri GDP)



**Fig:** Agriculture Science and Technology Indicators (ASTI) data reveal that India currently spends 0.30 per cent of agriculture GDP on agricultural research.

## HISTORICAL BACKGROUND OF AGRI. RESEARCH AND EXTENSION

- The history dates back to **1880** with the **establishment of Department of Agriculture in each Indian province.**
- Later, in response to the Montagu-Chelmsford Reforms in **1919**, the **Imperial Agricultural Research Institute (IARI)** was established to foster Agri research and education.
- Agricultural extension in the **post-Independence era was largely the function of State Departments** of Agriculture.
- The Indian Council of Agricultural Research (**ICAR**) began its participation in agricultural extension through **National Demonstrations in 1964.**
- In 1970's, transfer of research and education to State Agricultural Universities (**SAUs**), World Bank sponsored Training and Visit System (**T&V**), the launch of Krishi Vigyan Kendras (**KVKs**) by the ICAR etc. were some of the important steps taken.
- The government introduced the **Agricultural Technology Management Agency (ATMA) in 1998** to push more Agri extension.
- The establishment of Agri-Clinics and Agri-Business Centers (**AC & ABC**) **Scheme was to support private sector** initiatives in extension.

**The Department of Agricultural Research and Education (DARE)** was established in the erstwhile Ministry of Agriculture (currently Ministry of Agriculture and Farmers' Welfare) in December 1973. DARE coordinates and promotes agricultural research and education in the country.



सत्यमेव जयते  
Department of Agricultural Research  
and Education

**The Indian Council of Agricultural Research (ICAR)** was established in **1929** as a registered society under the **Societies Registration Act, 1860**. It is an **autonomous organization** under the DARE. The ICAR has played a pioneering role in **ushering Green Revolution.**



## ANIMAL HUSBANDRY AND ALLIED SECTOR

Animal husbandry is the branch of agricultural sciences that **deals with the study of various breeds of domesticated animals** and their management for obtaining better products and services.



### STATUS OF ANIMAL REARING IN INDIA

- As per the **Economic Survey-2021**, the contribution of Livestock in total agriculture and allied sector **GVA** (at Constant Prices) has increased from 24.32% (2014-15) to 28.63% (2018-19).
- According to National Accounts Statistics 2019 by Central Statistics Office (CSO), the value of output from livestock was about 31.81% of total agriculture and allied sector.
- India is the highest livestock owner of the world.
- As per the **20th Livestock Census**, the total Livestock population is 535.78 million in the country showing an increase of 4.6% over Livestock Census-2012.
- The number of usually working persons engaged in Animal production, Mixed Farming, Fishing and Aquaculture are in descending trend correspondingly (2017-2018 data).

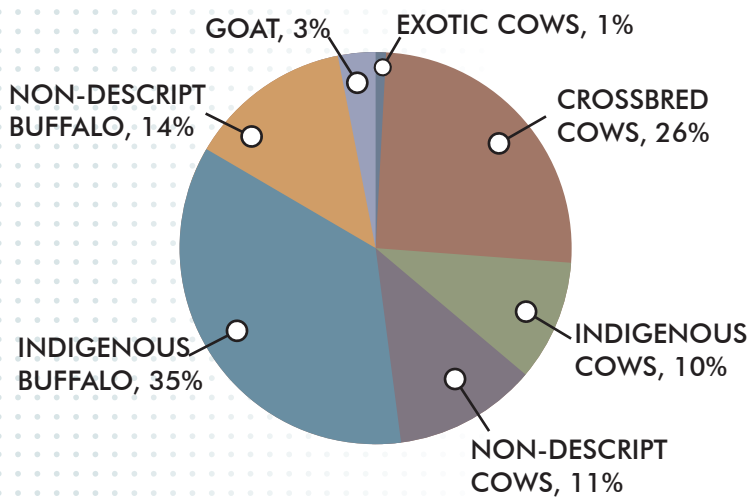
**The Livestock Census** is the main source of Livestock data in the country. It is conducted across the country periodically since 1919. It usually covers all domesticated animals and head counts of these animals are taken. So far, 20 Livestock Censuses were conducted in participation with State Governments and UT Administrations.

**Note:** Department of Animal Husbandry & Dairying releases this census.

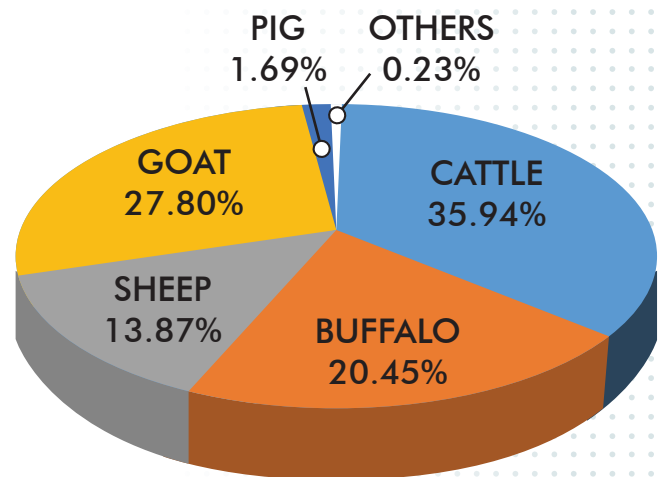




## CONTRIBUTION OF MILK PRODUCTION BY COW, BUFFALO AND GOAT IN 2018-19

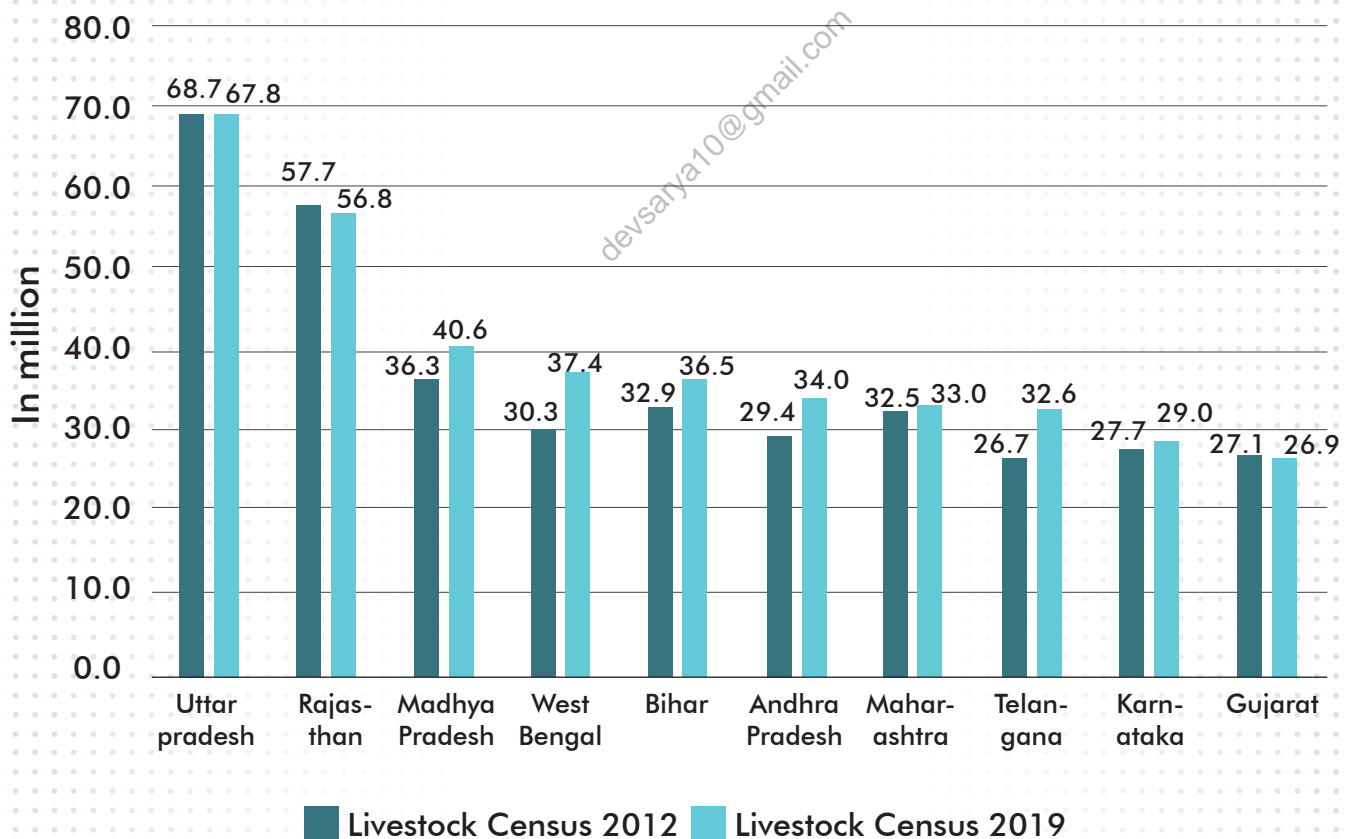


## LIVESTOCK POPULATION 2019 - SHARE OF MAJOR SPECIES



Contribution of milk production by cow, buffalo and goat in 2018-19.

## LIVESTOCK POPULATION, 2012 & 2019 OF MAJOR STATES



## MAJOR CROP AREAS

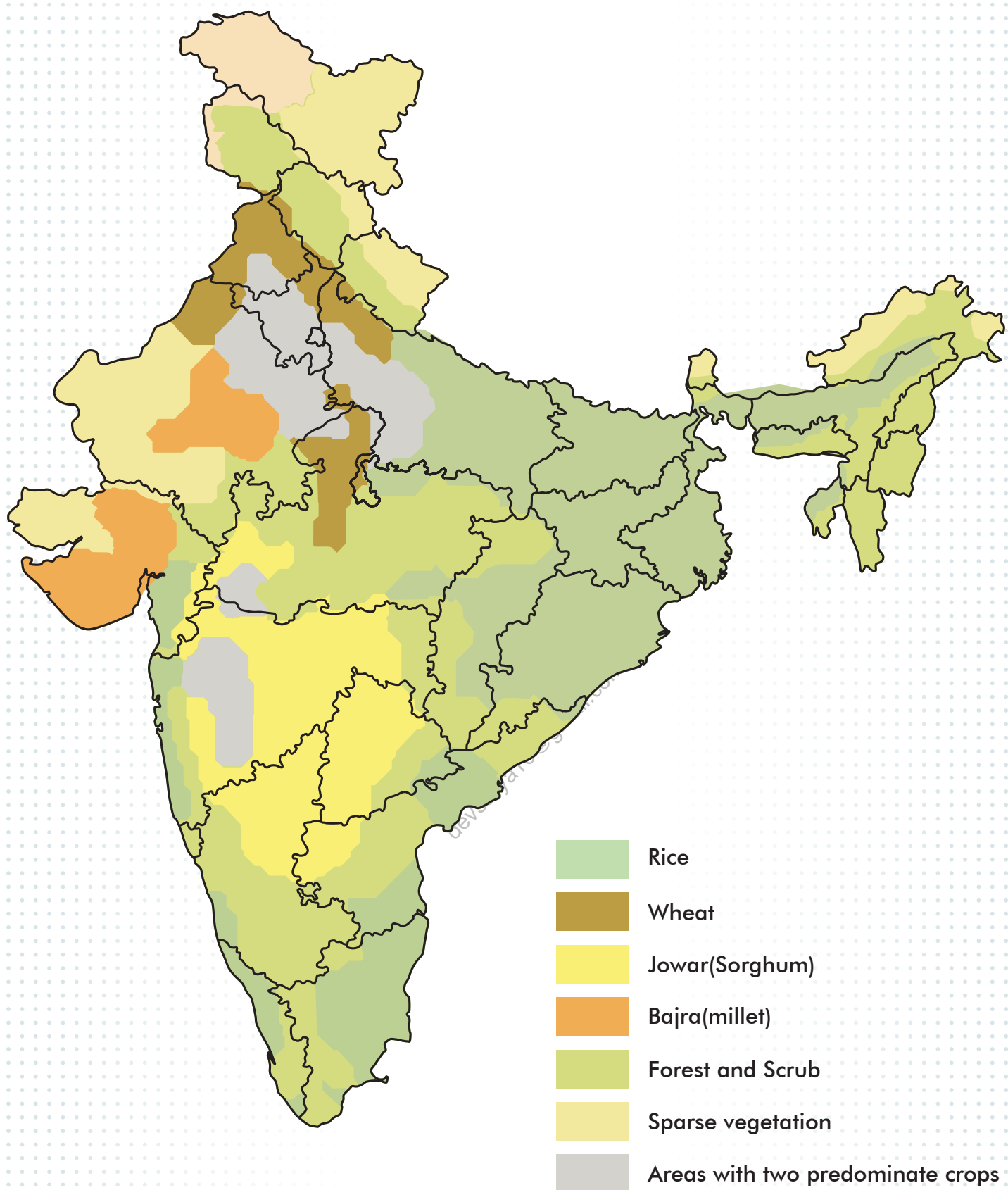


Fig: Major Agricultural Regions or Zones of India



## AGRICULTURE MAP (COMMERCIAL CROPS)

